

# Multi-use platforms at sea (MUPS): An innovative way to manage offshore space and reduce coastal anthropic pressure

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Supergen



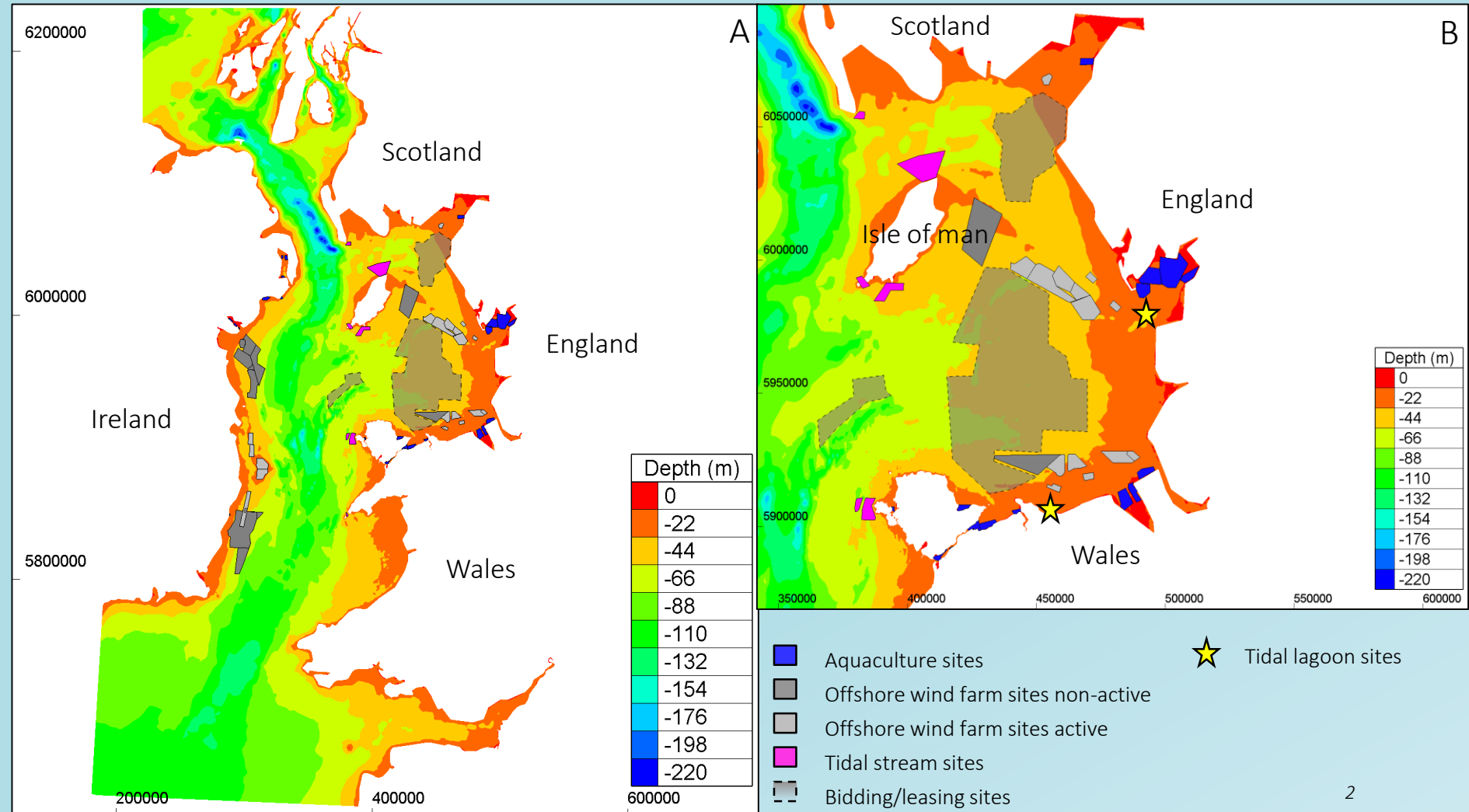
Offshore  
Renewable  
Energy



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## The Irish Sea is subjected to numerous industrial activities:

- ✓ Offshore Renewable Energy (ORE): approximately 6,564 km<sup>2</sup> (14 % of space occupation)
- ✓ Shellfisheries: *Mytilus edulis* L. aquaculture represents 40% to 50%
- ✓ Tourism
- ✓ Marine transport



# Overall project: → Studying the feasibility of MUPS in the Irish Sea

## 1) Create accurate tool:

- Waves, wind and tidal energy production potential
- Biological and physical requirements needed for different species (seaweed, bivalves, fish and crustaceans)
- Infrastructure requirements for aquaculture and energy devices.

## 2) Quantify and qualify the potential benefits and risks of co-location



# Supergen



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Knowledge Economy Skills Scholarships

## Method of study

### Mesh resolution:

- Spatial
- Temporal

### Physical parameters

- Tide
- Wind
- Waves

### Outputs:

- Connectivity variation in space and time
- Spatial distribution variation
- Distance travel from source site

### Outputs

- Water elevation
- Current velocity and direction

## 1. Hydrodynamic Model

## 2. Validation

### Method

- Tidal gauge (water elevation)
- Tidal analysis
- ADCP (speed and direction of currents)

## 3. Particle tracking model

### Dispersal parameters:

- Advection
- Diffusion
- Number particles release per site
- Area of release

### Biological parameters:

- Pelagic Larvae duration (PLD)
- Vertical migration
- Mid-water dispersal

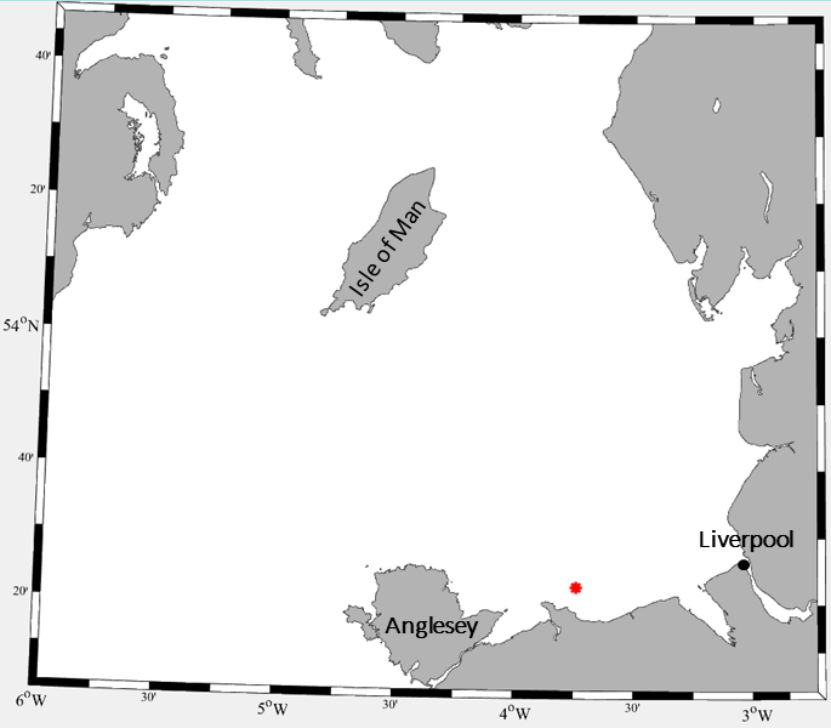
**“All models are wrong  
but some are useful”  
(George Box)**

The application of Lagrangian drifters will help:

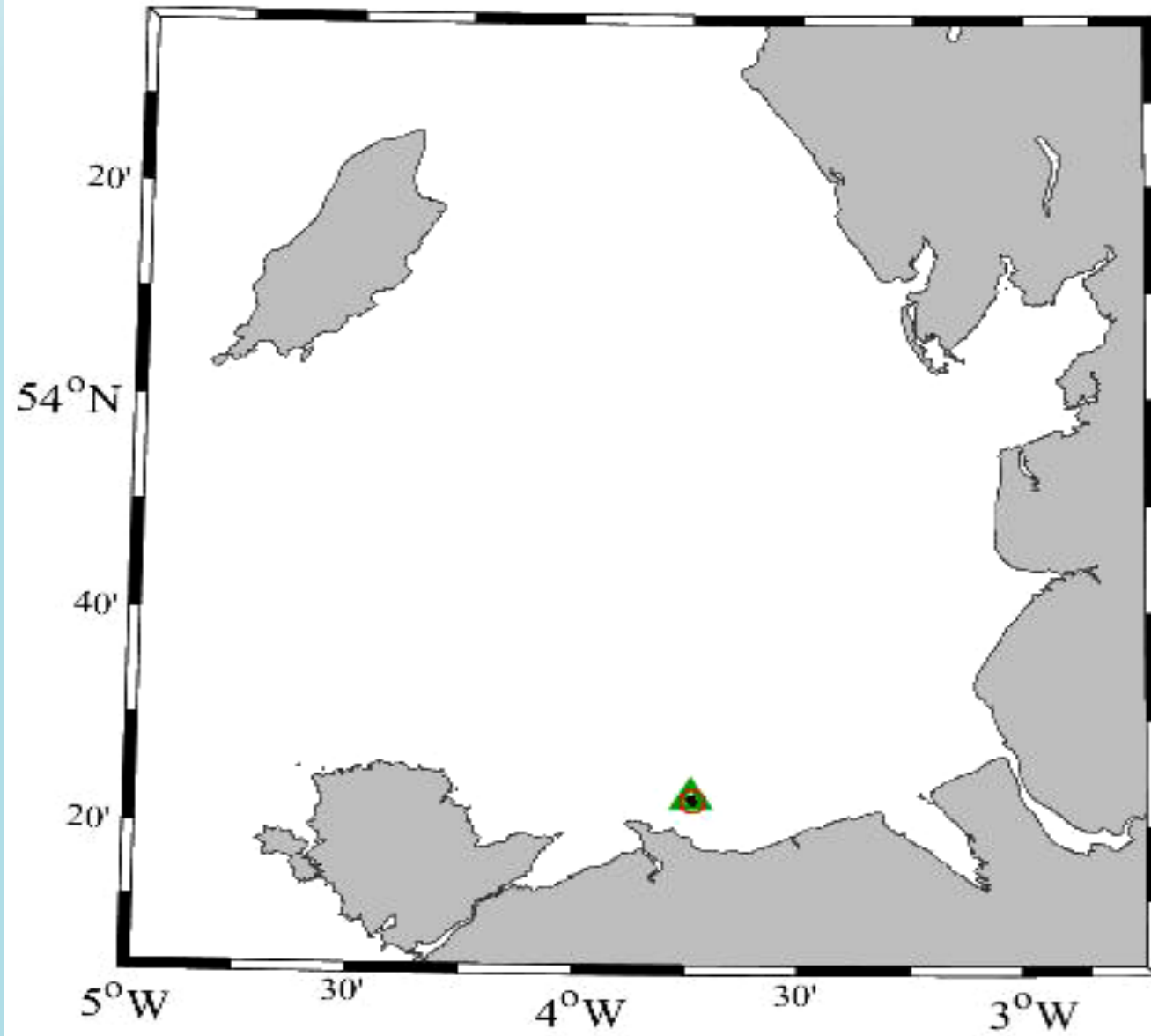
- To define larvae pathways
- To provide information on the possibility to collect larvae using offshore renewable energy (ORE) infrastructure
- To study the impact of ORE on larval recruitment
- To improve accuracy of Hydrodynamic and Particle tracking models for future ORE projects.

Experiment:






Release	Start of release	End of transmission	Time step (min)
Micro 1	18/07/2021	12/08/2021	30
Micro 2	18/07/2021	12/08/2021	30
Micro 3	18/07/2021	12/08/2021	30



18-Jul-2021 16:30:00



## Legend

-  Starting position
-  Drifter position through time
-  Drifter 1
-  Drifter 2
-  Drifter 3

## Next step:

- Compare drifter trajectory with numerical simulation:
  - ✓ Calculate distance between simulated trajectory and drifters trajectory under different scenarios.
  - ✓ Improve accuracy of PTM

Calculate wind impact on surface current to incorporate into PTM:

- ✓ Under different wind conditions and different depth
- ✓ Compare surface current between tidal model and observed data

